

**EASTERN CARIBBEAN INFORMATION COMMUNICATION  
TECHNOLOGY INITIATIVE**

**DOMAIN NAME REGISTRATION MEMORANDUM**

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# **REPORT AND RECOMMENDATIONS ON MODERN DNS SYSTEMS FOR OECS MEMBER STATES**

The domain-name system is an essential component of the modern commercial Internet's infrastructure. It enables easy-to-memorize unique alphanumeric names instead of number strings to be used to locate information and applications on the Internet. Internet access growth is still in its early stages in the OECS region. As Internet access and electronic business increase, there will be greater demand for names that employ country top level domains, or ccTLDs, such as ".gd", ".lc", ".vc", ".dm", and ".kn".<sup>1</sup> There is time now – and an opportunity -- to design state-of-the-art DNS systems for OECS deployment that reflect new IP technologies and public policy concerns. The experiences of other countries and their private sectors should be a foundation stone in constructing these new systems.

## **I. EXECUTIVE SUMMARY**

To facilitate the higher demand from greater e-commerce and Internet usage, each member state should promote an efficient modern DNS domestic infrastructure. To ensure high performance, high availability systems, our basic recommendations are as follows:

- Outsource operations to experienced database systems managers who will provide reasonably priced performance goals;
- System stability and security should be the DNS manager's principal goals because database failure will ultimately cripple Internet operations;
- Where feasible, anticipate future technological developments in the Internet and networked-based services and applications and be aware these could work to the advantage of member states as global Internet usage and electronic commerce increase;
- Use current industry standards wherever feasible in the choice of the registry – database operator – and approval of registrars, the processors of the domain name applications;
- Adopt the basic structure and standards of ICANN, the Internet Corporation for Assigned Names and Numbers, the global governance body for naming and numbering; and
- Encourage a competitive system for the registration of names;
- Wherever feasible, employ marketing techniques to encourage demand for names; and

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<sup>1</sup> There are currently 252 ccTLDs. This number includes locations that may not be independent but that are geographically distinct.

- Wherever feasible, adopt the most advanced Internet technologies for the DNS.

## **II. I. OVERVIEW OF THE DOMAIN-NAME SYSTEM**

The Internet is a complex public network of interconnected data networks using the TCP/IP protocol suite. Hidden, complex policy and operational matters that must be addressed to obtain the maximum benefit of the Internet affect the physical network itself. This report addresses the DNS-related issues and makes recommendations to ECTEL members.

The Internet has become a fundamental part of many nations' communications infrastructure. Internet technologies underpin the "information highway" that was hazily foreseen in the early 1990's. Key components of the Internet must be considered as part of any discussion of the public information and communications infrastructure. A crucial component of that Internet infrastructure is the domain-name system, or DNS, which enables a user easily to send or receive information or to interact with content and applications housed on the Internet.

### **A. GENERIC AND COUNTRY TOP LEVEL DOMAINS**

The Internet domain-name system (DNS) is an addressing technique by which easy-to-remember alphanumeric names are mapped to a unique set of numbers called Internet Protocol (IP) addresses that point to a port, or address, on the Internet where requested information or an application can be found. By definition, each domain name and IP address is unique. Names were introduced into the Internet in 1983 not because they were technically needed - - at that time there were only a few hundred thousand users -- but because it was simply easier for users to remember names rather than a number string. Without the DNS, a user could simply type the correct sequence of numbers and periods to access Internet data.

Each country requesting Internet connectivity has a unique country code called a ccTLD, or country code top-level domain.<sup>2</sup> In addition there are other generic top level domains, of which the best known is ".com". Because of its US origin, certain of these generic top level domains have been used largely (".com") or solely by Americans (".gov"). When the original naming and numbering system was established, the commercial nature of the Internet was not foreseen and the original names lacked monetary or commercial value. Many were educational institutions (".edu"). Moreover, categories were also more strictly demarked so that, for example, carriers and service providers were required to use ".net", non-profit entities were to use ".org", and so forth. Names to the left of the dot that begins a country code are termed "second level domains."

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<sup>2</sup> Of the ccTLDs, it is generally acknowledged that Canada, Australia, and the UK have the best operated DNSs, while the US country code ".us" is among the worst-managed.

Authority to administer country designations is delegated to a sponsoring organization by the Internet Assigned Numbers Authority (IANA), which assumed this function during the Internet's formative years. In turn, a sponsor names an administrator and technical contact. Countries have broad authority to administer their name space in any way they wish including but not limited to setting their own fee structures, determining what services are provided and by whom, determining second level domain categories, etc. Delegees (sic) and sponsors can change if a country so wishes. On rare occasion the identify of the sponsor and administrator can become controversial, and IANA prefers to have political questions settled outside the assignment, or delegation, process. From time to time, countries have also reformed the policies governing their Internet country code names.<sup>3</sup>

## **B. STRUCTURE OF THE DNS.**

Name information on the Internet is organized on a hierarchical basis. The definitive record is stored in a computer database called the root. The definitive Internet database for all name information, literally the "dot" or ".", is located on a server outside Washington, DC, with copies in Europe and Asia. Information about names and numbers is contained in specialized databases and computers called nameservers. When a name is typed into a browser program, databases are queried for the correct IP address – if necessary up the hierarchy of databases to the so-called "root server."

In addition, under the direction of ICANN, the administrator of the root also administers a database with supporting information called the Whois database. It contains the name of the individual who ordered a particular second level domain and contact information for the administrative and technical contact. That database can, but is not required, to store the IP addresses of a country's nameserver. ICANN collects a small fee for storing ccTLD information in the root.

According to the Organization for Economic Cooperation and Development (OECD), a significant amount of Internet traffic consists of such database queries. It also found a growing tendency to use country domains rather than the generic names like ".com". There are several reasons for this trend: the scarcity of good ".com" names, national pride, local appeal, etc. In the last two years, several new generic names have been approved, and it is not yet clear whether the availability of new names, some of them highly specialized, will affect this trend towards greater ccTLD use.<sup>4</sup>

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<sup>3</sup> In recent years, this has included the US, Canada, and the UK.

<sup>4</sup> These new generic names are ".aero" for air transport, ".biz" for businesses, ".coop" for cooperatives, ".info" for unrestricted use, ".museum" for museums, ".name" for individuals, and ".pro" for professional services.

### **III. INTERNET GOVERNANCE**

Technical standards and numbering falls under the jurisdiction of the Internet Corporation for Assigned Names and Numbers, or ICANN. ICANN is a non-profit international body formed on 30 September 1998 for purposes of providing technical-coordination functions for the Internet in the public interest. Among ICANN's responsibilities is to oversee operation of the Internet's authoritative Root-Server System

ICANN coordinates its work with IANA, which is still responsible for identifying country sponsors, reviewing changes to the root zone, and administering the “.us” top level domain. While there are still some countries that remain outside of the Internet, for the most part the functions associated with delegating authority to sponsors has been completed. IANA also makes occasional re-delegations and prepares reports on DNS and numbering changes.

ICANN has ongoing responsibility for providing technical coordination services for Internet names and numbering. In the process of establishing ICANN, including the US Government's White Paper that authorized the privatization of these functions, it was determined that registry functions, i.e., DNS database management, should be carried out by a single entity operating at arms length from registrars, commercial firms that accept and process an application for a name and places it with the registry for entry into the definitive database. The separation between a monopoly “registry” and competitive “registrars” applies to all generic TLDs coordinated by ICANN.<sup>5</sup>

This basic model, combining monopoly plus competitive functions”, was shaped by technical and commercial considerations and appears to be a sound business model for several reasons. First, under current technology it is difficult for a database to remain secure or to accommodate other technical factors unless it is operated by a single entity. Second, competition is possible in the provision of registrar services involving contacts with the end user. Moreover, competition is to be preferred because it encourages innovation and customer service. Some of the commercial registrars in the “.com” space also provide free or inexpensive limited hosting and e-mail services focused on small businesses and professionals who do not require more complex services. Competition also promotes economic efficiency. For several reasons, it makes enormous sense to designate a single database registry and multiple commercial registrars.

In addition to the basic data entry and querying functions, a registry is in a position to undertake tasks of interest to the sponsor. For example, it can encourage partnering registrars (if any) to offer registration service for a country code, i.e., to market a ccTLD. As noted above, competition tends to spur innovation, improve services and customer responsiveness, and drive prices to cost. There is a benefit to encouraging competitive registration, and an active, well-connected commercial registry could help market a country name.

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<sup>5</sup> Footnote 3 above plus “.com”, “.org”, and “.net”.

Notably successful in attracting non-domestic customers has been the island nation of Tuvalu (".tv"), which has many non-citizen registrants who see commercial potential in the ".tv" TLD. Verisign, formerly Network Solutions, is the registry for "com" and operates the ".tv" ccTLD nameserver out of the US.

#### **A. INTERNET STABILITY AND SECURITY**

A fundamental principle of the privatization of the Internet naming function is the need for stability in the basic DNS infrastructure. The root server is physically protected as well as protected by software firewalls. There are also duplicate to provide system redundancy. As part of the process, ICANN also requires registrants to meet certain minimum financial and operational criteria before they are allowed to offer public registration service. Out of this application process (which also involves a fee payment to ICANN for vetting applicants), ICANN approved approximately 150<sup>6</sup> registrars. ICANN guidelines further ensure that service providers are financially sound and experienced.<sup>7</sup> The guidelines set certain operational guidelines to protect consumers in the event a registrar fails or encounters technical problems.

Based on ICANN's early work, OECS members should be encouraged to adopt the same set of financial and operational criteria. Further, they should consider allowing ICANN approved registrars to offer registration services in the OECS states subject to the legal proviso that non-local registrars agree to the jurisdiction of members' courts in the event of a legal dispute. Given the virtual, distributed nature of the Internet, member governments may not otherwise have any jurisdiction over a registry or registrar. A registrar's business license should provide that action may be brought in the courts of a registrar's home country for sums above a minimum monetary threshold. Commercial disputes are inevitable. In the event of a problem, local consumers should have judicial recourse to a local court. Internet jurisdictional issues have spawned endless debate and contention in recent years.

#### **IV. ECTEL AND THE DNS**

Each OECS member state has a country code, sponsoring organization, administrator and administrative contact, and technical contact. They are as follows:<sup>8</sup>

- Dominica – dm
  - Sponsoring Organization: University of Puerto Rico
  - Administrative Contact: Belina Junquera, University of Puerto Rico
  - Technical Contact: Felix G. Ramos, University of Puerto Rico

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<sup>6</sup> This number has changed and will change because of problems in the IT industry. See <http://www.icann.org/registrars/accredited-list.html>

<sup>7</sup> See <http://www.icann.org/registrars/ra-agreement-12may99.htm>

<sup>8</sup> Information from the IANA Root-Zone Whois Database. <http://www.iana.org/root-whois/vc.htm> last updated 9/99.

- Grenada - .gd
  - Sponsoring Organization: Ta Maurryshow Community College, St. George's, Grenada
  - Administrative Contact: Loretta Simon, Ta Maurryshow Community College
  - Technical Contact: Felix G. Ramos, University of Puerto Rico
- Saint Kitts and Nevis - kn
  - Sponsoring Organization: University of Puerto Rico
  - Administrative Contact: Belina Junquera, University of Puerto Rico
  - Technical Contact: Felix G. Ramos, University of Puerto Rico
- St. Lucia - lc
  - Sponsoring Organization: University of Puerto Rico
  - Administrative Contact: Albert H. Daniels, University of Puerto Rico
  - Technical Contact: Felix G. Ramos, University of Puerto Rico
- Saint Vincent and the Grenadines - vc
  - Sponsoring Organization: Ministry of Communications and Works, Kingstown, St. Vincent & the Grenadines
  - Administrative Contact: Apollo Knights, Ministry of Communications and Works
  - Technical Contact: Felix G. Ramos, University of Puerto Rico

## **V. KEY PUBLIC POLICY ISSUES**

### **A. POLICY ISSUES BEFORE OECS**

As Internet usage and e-commerce rise, the question confronting policymakers of member states and NTRCs is the best administrative model for their national DNS, how ensure maximum performance, and how to maximize Internet benefits. The current institutional and operational arrangements appear to work for existing conditions, but are unclear whether they will suit members' future needs or expectations. The issues for member states are the following:

- Stability and security
- Service quality
- Administration and management
- Overall system cost and efficiency
- Adaptability and scalability to future needs
- Commercial uses and potential
- Repatriation



Of these, stability is by far the most important. It is imperative that the name and IP address mapping function be maintained in the future and during all periods in which changes are made to the DNS. Stability means that all names must be entered correctly into the relevant databases and that accurate routing information is propagated throughout the Internet on a timely and frequent basis without interruption. Increasingly, it also means that the crucial DNS databases are protected against malicious unauthorized intrusion. Threats to the Internet are becoming more frequent, and nameservers are an obvious vulnerable target for hackers and cyber-terrorists. System operators need to be sensitive to growing network threats and to provide the best system defenses available.<sup>9</sup> Whatever path is selected, periodic security reviews and necessary corrective actions are essential to protecting vital network resources such as the DNS. Security lapses need to be dealt with firmly and swiftly to protect vital communications links. A system operator should be able to patch a software problem quickly to prevent unauthorized entry by hackers. In the event of a serious operational problem with a root server, it is necessary for another site to assume the task of routing traffic to its proper destination. A protected mirror site is needed to ensure continuation of service and should be immediately available to handle data base traffic until the original site's service has been restored.

The second factor for member states to consider in evaluating their DNS service is service quality. Database queries should be handled ("resolved") quickly with a minimum of failures. As Internet usage grows, performance must be maintained in order to ensure a satisfactory Internet experience and to maintain service quality, which is essential where complex services and applications are involved<sup>10</sup>. High availability may be difficult if databases and computers cannot handle higher use. The Internet Engineering Task Force (IETF) calls for DNS databases to be "robust", i.e., to be able to handle normal traffic plus sudden unexpected spikes but does not otherwise precisely define the term. Realistically, congestion or disabling spikes is unlikely in light of current usage levels. Still, a modern DNS network ought to anticipate and accommodate increased usage and technological changes without impaired performance.

Third, the administrative suitability of the ccTLD DNS systems in the OECS should be evaluated in terms of overall cost and efficiency. The most important issue confronting policymakers is how to obtain the maximum performance and commercial benefits from the DNS. Over time there has been an increasing tendency to use commercial database managers and to rely on market forces rather than government operation. The reasons for this trend in both ccTLDs and gTLDs is simple. Private commercial enterprises are more sensitive than governments to market forces and have the incentive to cut costs and prices to attract customers. They also have the incentive to innovate and introduce new or better services and products. Because the Internet and services and

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<sup>9</sup> See CERT Coordination Center statistics at <http://www.icann.org/registrars/ra-agreement-12may99.htm>.

<sup>10</sup> For example, streaming video and audio require finding the correct URL or location.

applications have become market-driven, commercial considerations should guide administrative issues. **We recommend that member states outsource DNS operations (not excluding the incumbent manager) with a request for bids that includes the full range of goals sought by government sponsors rather than simple continuity of management.**

Fourth, the DNS network should be designed for maximum efficiency and minimum costs. Bidders for DNS management should provide their ideas on the most efficient configuration of the DNS network. As a general rule, it is preferable to keep database traffic local rather than international to reduce the demand for international leased circuits. Alternatively, ECTEL and the NRTC staffs may prefer to consult with network planners about the optimal network design. Historically, DNS traffic has tended to flow to the US, thereby incurring heavy payments to international carriers. DNS network design should be developed to minimize such traffic and their related costs. This is particularly important in those areas where international leased circuit costs are high. Network costs can be contained through a combination of high quality up-to-date software programs and hardware.

Fifth, a DNS network should be designed to scale with increased usage and technological changes. Increased Internet usage will result in the demand for new central office facilities, additional local lines, and overall increase in the physical capacity of the PSTN. In short, the physical telecommunications infrastructure will have to scale in anticipation of greater use.

Policymakers should also note be aware of impending changes in Internet technologies. There is a gradual movement to the Internet Protocol Version 6 (IPV6) rather than the IPV4 currently in use. IPV6 is in the process of being adopted methodically in Japan, China, and Europe because it allows for a vast increase in IP addresses instead of the limited number available under IPV4. It is recommended, therefore, that registries and registrars be prepared for this and other foreseeable changes even though adoption of IPV6 in North America has been slower than other geographical areas.

Another DNS-related technology to which attention should be paid is electronic numbering, or ENUM, which maps E.164 telephone numbers (international format) to DNS databases to bridge the public switched telephone network (PSTN) to IP networks.<sup>11</sup> ENUM creates a new emerging market using existing database technologies in different ways. While ENUM services are not yet available, services using ENUM technology are near introduction or trial. At a minimum, the DNS systems in the OECS region should not be incompatible with advanced ENUM-based services and other new services.

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<sup>11</sup> For a full explanation of ENUM, see <http://www.itu.int/osg/spu/infocom/enum/index.html>. The IETF ENUM protocol is described in the Internet standard RFC 2916. Its architecture and service description are being developed by the ENUM forum, <http://www.enum-forum.org>.

Sixth, as noted above, some domain names such as Tuvalu's (".tv") have commercial potential. Even when they do not, however, it is desirable to encourage maximum use of a country top level domain. It is in the interest of member states and registrants to have a registry that will actively market a country TLD to attract registrars and, if possible, to encourage e-commerce, Web use, and other applications.

Finally, in three of the five member states, the sponsoring organization is the University of Puerto Rico rather than a local institution or national government agency. While there is nothing wrong with this arrangement per se, the delegation of sponsoring authority to a non-domestic institution might be interpreted as a lack of technical ability and/or sovereignty. Should repatriation be sought, a re-delegation petition must be filed with IANA, whose home page <http://www.iana.org> lists several examples.

## **B. FEASIBILITY OF OUTSOURCING OPTION**

The choice of a database administrator should be measured against the criteria proposed above. As noted, we strongly recommend that member states and the NTRCs consider outsourcing the registry function to a qualified and experienced commercial database operator. While there are many experienced operators,<sup>12</sup> there are relatively few that have long background in providing high availability, high reliability database network services. Furthermore, the NTRCs will want a financially stable provider committed to the business for the medium to long-term. This is not to say that the University of Puerto Rico is providing or will provide inadequate service in the future but rather that the commercial nature of the Internet should be reflected in commercially focused administrators and optimal performance.

The most logical registries are those which have been approved by ICANN – Verisign<sup>13</sup> (formerly Network Solutions, Inc.), NeuLeve<sup>14</sup> (a joint venture of NeuStar and Melbourne IT, Ltd.), and Afiliis<sup>15</sup> (".info"). In addition, large telephone companies such as AT&T (which previously provided Network Solution's directory services) and local exchange companies are also experienced in such services. In addition to the aforementioned firms, Tucows and Register.com, Canadian and US registrars respectively, are also experienced database operators.

## **C. FINANCIAL CONSIDERATIONS**

Verisign charges registrars \$6 per year per name as the registry for ".com" and the other registries should charge identical or similar registry fees. While end-user costs vary, American registrars charge their customers approximately

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<sup>12</sup> These would include telephone carriers, financial institutions, credit card companies, and others.

<sup>13</sup> <http://www.verisign.com>

<sup>14</sup> <http://www.nic.biz>

<sup>15</sup> <http://www.nic.info>

US\$35 per year for their service<sup>16</sup>. Some also provide their customers limited e-mail and hosting services as part of a package. Thus far registrants have competed mainly on service rather than price.

Since incomes in the OECS are lower than in the US and Canada, this range of prices may initially appear high but they are not relative to expenses. With a minimum annual cost of \$6+other expenses, profit margins in this business are low or possibly non-existent (with the glaring exception of Verisign). It is even possible for most firms that basic registration service might even be a loss leader for hosting and other premium IT services. That said, however, it would not be inappropriate for member states to levy a nominal fee, e.g., US\$1.00. for each second level domain name registered to help defer their administrative costs. Revenues collected pursuant to this charge could be used to help fund a position at ECTEL to deal with Internet and data policy or a position at each NRTC. Internet-related issues will increasingly confront ECTEL and the NTRCs, and a funding mechanism may enable ECTEL develop the expertise to manage Internet-related issues of regional concern.

## VI. ELEMENTS OF AN OUTSOURCING CONTRACT

If the NTRCs should decide to pursue the recommended outsourcing option, they should consider including the following elements in their contracts. These recommendations are based on the issues raised above in Part IV. As there are few precedents, the NTRCs should use existing contracts as the starting point and template for negotiations. Such contract negotiations should address unique local conditions as well as new legal, policy, and technical developments.

- **Stability.** Traditionally data network operators employ a standard of 99.9 percent uptime.<sup>17</sup> This would not include downtime caused by events not under the control of the registry, e.g., cable cuts.
- **Security.** At this time there is no prevailing standard for security of a DNS but the standard should be better than the Internet's "best efforts" in light of the growing threat to network security. A variety of requirements could be employed. As an example, administrators of ccTLD databases could be required to employ the same, similar or tougher security measures than those used to protect other ccTLD servers. Or in the case of Verisign, Afilias, or NeuLevel, they should use be required to provide the same level of security they employ to protect their gTLD databases.
- In the event of a serious emergency, it may be necessary to restore quickly Internet connectivity. Therefore, mirror databases should be set up far enough away from the original sites to ensure survival of routing (mapping) information.

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<sup>16</sup> Canadian registrars charge US\$5 – 10 less than their US counterparts.

<sup>17</sup> The uptime standard for the PSTN is 99.99 percent – considerably better than data networks.

- **Services provided.** An outsourcing agreement should be specific as to the services to be provided by a registry to the ccTLD sponsor. Such commercial services are relatively new, and current registries provide services to only a few countries. A model contract drafted by ICANN describes a manager's duty as "competently maintaining nameservers"<sup>18</sup> and states that a manager is to use his "best efforts".
- A manager's duties should consist of taking and entering accurately information from a registrant into the country TLD data base and maintaining an accurate database and whois database in a timely and competent manner. It is likely that over time duties and responsibilities will become clearer, based on the parties' experiences. Appropriate contract changes can then be made upon renewal of a contract. To ensure fulfillment of a contract, the NTRCs may wish to consider requiring registries to take out insurance if it is available.
- **Potential legal issues.** The two big issues facing the sponsor and registry are jurisdiction and dispute resolution. In the event of a disagreement, the sponsor will probably want to ensure that local courts will have jurisdiction over the registry and that local laws will apply if the manager is non-local and has no local physical presence.
- To facilitate resolution of a legal dispute, we recommend that the contract specify an alternative dispute resolution (ADR) mechanism such as arbitration. As a general rule, extended legal proceedings should be avoided since litigation costs and litigiousness might discourage a registry from entering the country market.
- **Intellectual Property Rights (IPR).** IPR are a legitimate and substantial part of the bundle of legal issues that must be considered and reflected in the contract. IP rights holders have expressed concern that trademarked brand names or service marks have been registered for use (or misuse, say trademark owners) or resale by cybersquatters and have sought to make IPR **the** major issue in domain names.
- Attempts to distort the DNS by making IPR its central concern are ill-founded and ill-advised. DNS is first and foremost a technology to map names to IP addresses – not an advertising or commercial medium. Subject to international agreements, each sovereign state determines IP rights within its national borders. Intellectual property plays an important economic role, and rights holders do have legitimate concerns about the misuse of trademarks and brands. However, IP policies need to be addressed within the context of the entire social, economic, and political order rather than dominate it as some would like. Rightsholders have been asserting their "rights" and concerns after adoption and implementation of DNS technologies.

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<sup>18</sup> See <http://www.icann.org/cctlds/cctldconst-8th-draft-contract-14nov00.htm>.

- Accordingly the mechanism that has been established by ICANN and the World Intellectual Property Organization (WIPO)<sup>19</sup> to deal with IPR disputes is a dispute resolution process that deals with complaints after a domain name has been registered. Rightsholders, including celebrities, have won the large majority of cases brought under the dispute resolution process.
- As a general rule, registries and registrars have argued cogently that they should not act as the arbiters in blocking registration. That position is generally sound since they cannot know every trademark or service mark or IPR law in every country. However, at a minimum they should be required to check into potential abuse of global brands (for example, “IBM.gd”, “DaimlerBenz.lc” and the like) but should not be required to protect non-global brands or trade or service marks that have not been registered in the OECS states. Disputes over non-global marks should be handled by a national dispute resolution panel model on WIPO’s model. Experienced database managers such as Verisign, Afiliat, and NeuLevel have had experience in dealing with IPR problems and should have little difficulty in complying with contract requirements<sup>20</sup>
- **We recommend that the contract with the registry operator require it to establish mechanisms to protect global brands and to participate in reasonable dispute resolution procedures.** Responsibility for protecting national or regional OECS brands (e.g., hotels or resorts) belongs to national authorities. They should work and consult with their registry manager to create fast, flexible mechanisms to protect IPR without reducing the benefits of fast, inexpensive domain name registration. Further, OECS member states may wish to consider centralized vetting and dispute resolution mechanisms to manage IPR issues. If it wishes ECTEL to handle these matters, such program must be adequately funded and not detract from ECTEL’s central mission.
- **Length of contract.** There are few precedents for deciding how long a management contract should be valid. Too short a term might discourage bidders while a long contract may lock a sponsor into an unsatisfactory arrangement. Wherever relevant, we recommend sponsors follow other, similar contracts and fact situations.<sup>21</sup> Certainly the contract should provide for termination “for cause” and with reasonable notice.
- **Financial Issues.** The contract should be clear about the underlying transaction fees and all other registry charges. Sponsors should allow market forces to determine prices rather than governmental fiat. In addition, if it wishes to collect an administrative fee, the sponsor might want

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<sup>19</sup> This process is described at

<http://ecommerce.wipo.int/domains/cctlds/background/index.html>

<sup>20</sup> NeuLevel also established an early registration period so that registrations could be vetted by rights holders. There are similar mechanisms whereby potential legal disputes can be minimized.

<sup>21</sup> As noted, Verisign has contracts to operate several country TLDs. However, it is unclear whether these contracts will be available for examination.



to ask the registry to add it to the basic registry fee and to the administrative fee to the sponsor or specified recipient.

- **Definitions.** Internet terms are defined in ICANN contracts and other documents on its Web sites. These definitions are standard for this industry and can be incorporated into contracts without problem by reference. This does not solve the definitional problem as other phrases such as “best efforts” and “competent” have no basis in case or common law. Some day these terms may become the subject of a legal disagreement[s]. Member states and the NTRCs should first look to local case law or statutes for guidance. Failing that, the parties should use these terms sparingly and agree to revisit these issues in the future.
- **Miscellaneous registry services and benefits.** An outsourcing contract should further specify whether a sponsor requires a registry to promote commercial use of a country name or other promotional initiatives.
- Operation of a DNS database entails sophisticated IT skills. Ideally it would be desirable if such know-how could be shared with OECS citizens through hands-on training, educational programs, etc. This objective should not undermine the selection of the best DNS operator. However, in the course of negotiations, it should be considered a plus if a bidder were to offer database training as an inducement.

## VII. CONCLUSION

With Internet use in its early growth period, the OECS member states supported by their NTRCs and ECTEL have an opportunity to build on the experience of others and construct a state-of-the-art DNS systems that reflect new technologies and current best practices. However, since DNS privatization and the creation of ICANN in 1998, there have been only sporadic efforts to define precise performance standards and the legal responsibilities of participating stakeholders in DNS operations. As a consequence, outside the IPR area, there have been few precedents as to what constitutes best practices or best efforts. Among the unanswered legal questions are stakeholders' liability for failure to perform and the appropriate monetary value of damage claims. Policymakers should be aware of the fact that many DNS policy questions are unsettled. Because database management services is a new industry, we are witnessing a sector that is evolving quickly, with multiple business models for registries, registrars, and DNS customers.

Notwithstanding lingering uncertainty and rapid change, this report has identified and discussed major areas of concern, matters that may interest policy makers, and made recommendations on selection of DNS database operators/managers and on the elements to be included in contracts with operators. To recapitulate, the recommendations were:

- Outsource DNS database management (registry) services to experienced operators;
- Make stability and security the principle DNS operational goals;

- Encourage competition among registrars and a market-driven business model for the DNS space;
- Adopt ICANN standards in the selection of registries and registrars;
- Adopt (by reference or explicitly) standard industry definitions and terminology particularly as found in ICANN legal documents;
- Anticipate and accommodate emerging services and technologies such as IPV6 and ENUM;
- Encourage reasonable commercial promotion of the DNS to encourage electronic commerce in member states and throughout the region.